REMARKS

Claims 1-5 and 13-14 were pending in the present application. Claims 6-12 have been cancelled, and Claim 13 has been amended, leaving Claims 1 – 5 and 13 – 14 for consideration upon entry of the present amendment. Support for the amendment to Claim 13 can at least be found in Claims 1 and 3 as originally filed.

Reconsideration and allowance of the claims is respectfully requested in view of the above amendments and the following remarks.

Double Patenting Rejection

Claims 3-5 stood provisionally rejected in the parent application under the judicially created doctrine of obviousness double patenting as allegedly unpatentable over Claims 3-5 of co-pending Application No. 09/842,617 to Dubey et al. and further in view of U.S. Patent No. 4,609,346 to Siccardi et al. Dubey et al. has issued as U.S. Patent No. 6,524,464. Claims 3-5 of Dubey et al. were cancelled during prosecution, thereby rendering this rejection moot. Reconsideration and withdrawal of the rejection of these claims are requested.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 1-5 and 13-14 stood rejected in the parent application under 35 U.S.C. § 103(a) as allegedly unpatentable over U.S. Patent No. 5,736,016 to Allen et al. and further in view of U.S. Patent No. 4,609,346 to Siccardi et al. Applicants respectfully traverse this rejection.

U.S. Patent No. 5,736,016 to Allen et al. (hereinafter "Allen") generally describes an electrolytic cell for producing a mixed oxidant gas comprising chlorine and chlorine dioxide for treating bodies of water. A water soluble chloride anolyte is fed to the anode of the electrolytic cell whereas water is fed to the cathode. During operation of the cell, sodium ions diffuse through a permeable membrane from the anode to the cathode. At the cathode, water is electrolyzed to produce hydrogen gas and hydroxide ions, which combine with the diffused sodium ions to produce a sodium hydroxide effluent. The hydrogen gas is a byproduct of the reaction to produce chlorine containing gas species, e.g., chlorine and chlorine dioxide. According to Allen, in order to drive the electrolytic reactions in both the anode and the cathode chamber to completion, the hydrogen gas is transported from the cathode chamber (Col. 14, lines

30-32). A catholyte reservoir is employed for this purpose.

U.S. Patent No. 4,609,346 to Siccardi et al. (hereinafter "Siccardi") generally describes various environmental control systems for use with large structures. The environmental control systems include an air velocity sensor, which is more clearly shown in Figure 6. As described by Siccardi, the air velocity sensor consists of a simple sail switch of conventional design that includes a microswitch with a button actuator. The sail is pivotally mounted and has a tab extending in a position to contact and actuate the button when the sail is deflected from the vertical by a predetermined air velocity. The air velocity sensor is adjusted to operate to close the switch associated therewith when the air velocity is such that the air volume through a hood from the outside is at a desired value, which is at least five times greater than the volume of fresh air needed to supply combustion oxygen for the burner at its maximum fuel consumption rate. (Col. 7, lines 9-25) The air velocity sensor provides a signal to control logic indicating any condition of insufficient combustion air being provided from the outside air inlet of the system, in which event control logic responds and shuts down the burner. (Col. 8, lines 25-34) In this manner, Siccardi minimizes production of carbon monoxide due to insufficient air volume.

Applicants' Claims 1 and 3 are directed to a hydrogen gas generating system and a hydrogen gas generator, respectively. Independent Claim 13 is directed to a hydrogen gas generating electrolysis cell.

In determining the differences between the prior art and the claims, the question under 35 USC §103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. *Stratoflex, Inc. v. Aeroquip Corp.* 713 F.2d. 1530, 218 USPQ 871 (Fed Cir. 1983). It is submitted that the Examiner has failed to consider the claimed invention as a whole and is improperly relying on hindsight. The Examiner appears to be disregarding the fact that the claimed invention is directed to a hydrogen gas generator (Claim 1), a hydrogen gas generating system (Claim 3), and a hydrogen gas generating electrolysis cell (Claim 13). None of the references cited, individually or in combination, teach or suggest a hydrogen gas generator, a hydrogen gas generating system, or a hydrogen gas generating electrolysis cell as claimed.

As noted above, Allen is directed to an electrolytic cell for generating chlorine containing gaseous product for treating large bodies of water. The chlorine containing gaseous product is

introduced to the body of water for controlling biological activity, corrosion, and scaling. Siccardi teaches an environmental control system for use in large volume structures, which essentially functions as an air handler for these large structures. The airflow provided by Siccardi is 5,000 to 15,000 cubic feet per minute. (Col. 5, lines 65-67) Among the structures in which Siccardi intends to use the environmental control system are enclosures of livestock and poultry as well as for warehouses, greenhouses, and manufacturing facilities. (*See* Siccardi, Col. 1, lines 12-27) These are indeed very large and different structures than the electrolysis cell of Allen. For example, Allen discloses that the preferred volume for the anode and cathode chambers of the electrolytic cell is a mere 100 milliliters. (Col. 8, lines 47-67) A 40-ampere electrolytic cell is disclosed in Allen as having an anode plate dimension of about 33 centimeters by 13 centimeters (Col., 6, lines 42-50). As such, both Allen and Siccardi teach and suggest markedly different systems that are clearly not the hydrogen gas generator or the hydrogen gas generating system or the hydrogen gas generating electrolysis cell as claimed by Applicants. Consequently, there is no motivation to combine these references, or even if combined, arrive at the present application.

It is well established patent law that there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art (see generally MPEP §2143.01). It is unlikely that one of ordinary skill in the art would combine these references since the ventilation system (an airflow of 5,000 to 15,000 cubic feet per minute) described by Siccardi is designed for very large structures and does not suggest any sort of electrolytic cell. In contrast, the electrolytic cell is relatively small. In providing the reasons for combining Allen and Siccardi, the Examiner opines that the knowledge is generally available to one of ordinary skill in the art, commenting that:

> every middle school student knows hydrogen can be very dangerous in large quantities or if handled incorrectly as shown in the Hindenberg airship fire where hydrogen provided the fuel for the fire. Therefore, one having the knowledge generally available to one of ordinary skill in the art would have reasonably combined the teachings of Allen and Siccardi to come up with the claimed invention.

(Paper No. 13, page 5; emphasis in original)

With respect to the Hindenberg airship fire referred to by the Examiner in the Final Rejection of these claims in the parent application, Applicants are not experts on the accident and

the Examiner has failed to provide evidence that improper handling of hydrogen caused this fire. Applicants believe that diesel fuel aboard the Hindenberg, in conjunction with the anti-rust coating (comprising a material now used as a rocket propellant) were the major factors in that fire; all of which is unrelated to the point at issue here.

Additionally, Applicants fail to follow the Examiner's logic set forth in the Final Rejection in the parent application. Allen teaches the use of an electrolytic cell for producing chlorine containing gaseous products for treating bodies of water. Although hydrogen gas is produced as a byproduct, it is produced in small quantities as evidenced by the preferred size of the electrolytic cell (Col. 6, lines 45-50), the size of the vapor space where the hydrogen gas collects (e.g., Figure 1, Reference No. 88), and by the fact that Allen suggests venting the hydrogen gas directly to the atmosphere (see Col. 14, lines 53-55). Clearly, since Allen teaches venting the hydrogen gas byproduct directly to the atmosphere, one of ordinary skill in the art would conclude that there is no dangerous buildup of hydrogen byproduct gas produced by the chlorine electrolytic process as disclosed and taught by Allen. Moreover, once the hydrogen gas is vented from the electrolytic cell, there is no disclosure or suggestion in Allen of an enclosure wherein dangerous amounts of hydrogen gas could possibly accumulate. Thus, even with the knowledge generally available to one of ordinary skill in the art, there would be no need for a ventilation system.

It is also noted that Allen discloses that chlorine containing gaseous products produced by its electrolytic cell, such as chlorine dioxide gas, can be explosive (see Col. 1, lines 49-52). Yet, in view of the presence of this explosive gas, Allen fails to teach or suggest the use of a ventilation system other than venting byproduct hydrogen gas directly to the atmosphere.

Similar to Allen, Siccardi fails to teach or suggest generating hydrogen gas in any quantity. Rather, Siccardi is directed to a combustion apparatus for use with large structures, which is markedly different from a hydrogen gas generating system including an electrolysis cell. The airflow provided by Siccardi's ventilation system is relatively high at 5,000 to 15,000 cubic feet per minute. It is unlikely that one of ordinary skill in the art would employ a ventilation system having an airflow of 5,000 to 15,000 cubic feet per minute for an electrolytic reactor, which to put it simply is "way overkill". Thus, it is submitted that there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of

ordinary skill in the art, to combine these references.

Even if the references were properly combinable, which they are not, the combination would still fail to produce the claimed invention. In Claim 1, the hydrogen gas generating system, comprises a reactant source; an electrolysis cell disposed in fluid communication with said reactant source; an electrical source disposed in communication with said electrolysis cell; and a ventilation system disposed in communication with said electrolysis cell, said ventilation system comprising, a fan adapted to produce a continuous airflow during operation of the gas generating system, a sail disposed in operable communication with said fan, said sail being pivotally movable in response to an airflow from said fan, and a switch disposed in operable communication with said sail and said electrical source, wherein said switch is adapted to discontinue operation of the electrolysis cell upon the malfunction or failure of ventilation system.

A combination of Allen and Siccardi would result in a chlorine containing gas electrolytic cell (not a hydrogen gas generating system) with a ventilation system designed for use in large structures. The resulting system would have no expectation of success and in fact, pose a significant safety risk. For example, the ventilation system as taught by Siccardi includes a burner located upstream of a fan portion. Depending on the configuration with the electrolytic cell, the environment about the electrolytic cell would either be sucked into the ventilation system and pass through the burner (see Figure 5, and Col. 5 at line 52 to Col. 6 line 55), possibly combusting vented hydrogen, or the electrolytic cell would be exposed to an airflow velocity of 5,000 to 15,000 cubic feet per minute, possibly causing significant damage. Moreover, since the ventilation system includes a burner, the air flowing across the electrolytic reactor would be heated, which would likely present problems during operation of the electrolytic cell. Still further, in Siccardi, the ventilation system includes a sail switch that is designed to frequently turn the fan portion on and off to maintain sufficient airflow through the ventilation hood for combustion to occur with minimal production of carbon monoxide. Siccardi discloses that the duty cycle for the fan operation ranges from 0.04 to 0.7 (Col. 4, lines 18-22). Thus, the fan would not provide the continuous airflow as claimed in the present application. As such, the combination of references fails to establish a prima facie case of obviousness since numerous claim elements are not taught or suggested from the combination.

Independent Claim 3 recites, among other elements, a fan portion configured to produce a continuous airflow. As discussed above, the ventilation system of Siccardi is not designed to provide a continuous airflow. Rather, Siccardi teaches periodically turning the fan off and on to minimize carbon monoxide generation.

Independent Claim 13 recites means for interrupting power to a means for generation hydrogen gas upon detection of a malfunction or failure of a ventilation system. The claimed hydrogen gas generating electrolysis cell minimizes the delays in shutting down the electrolysis cell that was associated with the prior art. By configuring the system such that the interruption of power to the system is dependent upon the malfunction or failure of ventilation system instead of pressure in a delivery line, the electrolysis cell is shut down prior to any leakages of hydrogen gas. This represents a significant advantage. The combination of Allen and Siccardi fails to teach or suggest means for interrupting power to said means for generation hydrogen gas upon detection of a malfunction or failure of a ventilation system. As previously discussed, Allen fails to teach or suggest a ventilation system disposed in communication with the electrolysis cell as claimed. Rather, Allen teaches venting the byproduct hydrogen gas directly to the atmosphere. Siccardi fails to teach or suggest means for interrupting power to said means for generation hydrogen gas upon detection of a malfunction or failure of a ventilation system. The system as taught by Siccardi is arranged to assure that more than ample combustion air is provided to the burner so that oxygen depletion in the air or formation of carbon monoxide will be far below those values determined to be safe and acceptable. The sail switch is designed to turn off the fan portion in the event of insufficient airflow from the outside. The sail switch is not configured to provide means for interrupting power to said means for generation hydrogen gas upon detection of a malfunction or failure of a ventilation system. Thus, even if the references are combined, there still is no disclosure or suggestion of any means for interrupting power to an electrolytic cell upon malfunction or failure of the ventilation system.

Considering that Allen and Siccardi, alone and in combination, fail to render the present invention obvious, reconsideration and withdrawal of rejections set forth in the Final Rejection of these claims in the parent application are requested.

It is believed that the foregoing amendments and remarks fully comply with the rejections set forth in the Final Rejection and the Advisory Action of Claims 1 – 5, 13, and 14 in the parent application and place this application in condition for allowance. Reconsideration and withdrawal of the rejections and allowance of the case are requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

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